

**What is Claimed:**

1. A method of inducing B cell apoptosis comprising:  
contacting a B cell with a polyclonal anti-thymocyte serum or at least  
5 one of a plurality of monoclonal antibodies, or effective fragments or variants thereof,  
that bind to B cell surface markers under conditions effective to induce apoptosis of  
the contacted B cell.
2. The method according to claim 1 wherein the B cell is selected  
10 from the group of immature B cells, naïve B cells, activated B cells, memory B cells,  
blastic B cells, and plasma B cells.
3. The method according to claim 1 wherein the B cell is a CD19<sup>+</sup>  
peripheral blood B cell, CD40L activated B cell plasmablast, and/or normal human  
15 plasma cell.
4. The method according to claim 1 wherein said method is  
carried out using a polyclonal anti-thymocyte serum.
- 20 5. The method according to claim 4 wherein the polyclonal anti-  
thymocyte serum is from a primate or pig.
6. The method according to claim 1 wherein said method is  
carried out using at least one of a plurality of monoclonal antibodies or effective  
25 fragments thereof.
7. The method according to claim 6 wherein the monoclonal  
antibodies are humanized monoclonal antibodies or fragments thereof.
- 30 8. The method according to claim 6 wherein the plurality of  
monoclonal antibodies comprise two or more antibodies, or effective fragments or  
variants thereof, that recognize a B cell surface marker selected from the group of  
CD16, CD19, CD20, CD27, CD30, CD32, CD38, CD40, CD45, CD80, CD86, CD95,  
CD138, HLA-A, HLA-B, HLA-C, HLA-DR, HLA-DQ, HLA-DP, MHC Class I,  
35 MHC Class II, sIgG, sIgM, sIgD, sIgE, and sIgA, hyaluronic acid receptor, alpha

interferon receptor, Ig Kappa-or lambda-light chain, Ig heavy chain, and TNF proteins.

5                   9.       The method according to claim 1 wherein the B cell is *in vitro*.

10                  10.       The method according to claim 1 wherein the B cell is *in vivo*.

11.       A method of inducing apoptosis in myeloma cells comprising:  
contacting a myeloma cell with a polyclonal anti-thymocyte serum or  
10 at least one of a plurality of monoclonal antibodies, or effective fragments or variants thereof, that bind to a myeloma cell surface marker under conditions effective to induce myeloma cell apoptosis.

12.       The method according to claim 11 wherein said method is  
15 carried out using a polyclonal anti-thymocyte serum.

13.       The method according to claim 12 wherein the polyclonal anti-thymocyte serum is from a primate or pig.

20                  14.       The method according to claim 11 wherein said method is carried out using at least one of a plurality of monoclonal antibodies or effective fragments or variants thereof.

15                  15.       The method according to claim 14 wherein the monoclonal antibodies are humanized monoclonal antibodies or fragments thereof.

16.       The method according to claim 14 wherein the plurality of monoclonal antibodies or effective fragments thereof comprise two or more antibodies, or effective fragments or variants thereof, that recognize a myeloma cell  
30 surface marker selected from the group of CD16, CD19, CD20, CD27, CD30, CD32, CD38, CD40, CD45, CD80, CD86, CD95, CD138, HLA-A, HLA-B, HLA-C, HLA-DR, HLA-DQ, HLA-DP, MHC Class I, MHC Class II, sIgG, sIgM, sIgD, sIgE, and sIgA, hyaluronic acid receptor, alpha interferon receptor, Ig Kappa-or lambda-light chain, Ig heavy chain, and TNF proteins.

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17. The method according to claim 14 wherein the myeloma cell is CD138<sup>+</sup>.
18. The method according to claim 11 wherein the myeloma cell is  
5 *in vitro*.
19. The method according to claim 11 wherein the myeloma cell is *in vivo*.
20. A method of treating multiple myeloma comprising:  
providing either (i) a polyclonal anti-thymocyte serum or (ii) at least one of a plurality of monoclonal antibodies, or effective fragments or variants thereof, that bind to a myeloma cell surface marker; and  
administering to a patient experiencing multiple myeloma an amount  
15 of (i) or (ii) that is effective to destroy myeloma cells, thereby treating the multiple myeloma condition.
21. The method according to claim 20 wherein said method is carried out using a polyclonal anti-thymocyte serum.
22. The method according to claim 21 wherein the polyclonal anti-thymocyte serum is from a primate or pig.
23. The method according to claim 20 wherein said method is  
25 carried out using at least one of a plurality of monoclonal antibodies or effective fragments or variants thereof.
24. The method according to claim 23 wherein the monoclonal antibodies are humanized monoclonal antibodies or fragments thereof.
25. The method according to claim 23 wherein the plurality of monoclonal antibodies, or effective fragments or variants thereof, comprise two or more antibodies that recognize a myeloma cell surface marker selected from the group of CD16, CD19, CD20, CD27, CD30, CD32, CD38, CD40, CD45, CD80, CD86,  
35 CD95, CD138, HLA-A, HLA-B, HLA-C, HLA-DR, HLA-DQ, HLA-DP, MHC Class

I, MHC Class II, sIgG, sIgM, sIgD, sIgE, and sIgA, hyaluronic acid receptor, alpha interferon receptor, Ig Kappa-or lambda-light chain, Ig heavy chain, and TNF proteins.

5                    26.     The method according to claim 20 wherein said administering is carried out orally, parenterally, subcutaneously, transdermally, intravenously, intramuscularly, intraperitoneally, by intranasal instillation, by implantation, by intracavitary or intravesical instillation, intraocularly, intraarterially, intralesionally, by application to mucous membranes.

10                   27.     The method according to claim 20 further comprising:  
periodically repeating said administering.

                    28.     A method of treating a B cell or plasma cell-related  
15 autoimmune disorder comprising:  
                    providing either (i) a polyclonal anti-thymocyte serum or (ii) at least one of a plurality of monoclonal antibodies, or effective fragments or variants thereof, that bind to a B cell or plasma cell surface marker; and  
                    administering to a patient experiencing a B cell or plasma cell-related  
20 autoimmune disorder an amount of (i) or (ii) that is effective to destroy B cells or plasma cells responsible for the autoimmune disorder, thereby treating the B cell or plasma cell-related autoimmune disorder.

                    29.     The method according to claim 28 wherein said method is  
25 carried out using a polyclonal anti-thymocyte serum.

                    30.     The method according to claim 29 wherein the polyclonal anti-thymocyte serum is from a primate or pig.

30                   31.     The method according to claim 28 wherein said method is carried out using at least one of a plurality of monoclonal antibodies or effective fragments or variants thereof.

                    32.     The method according to claim 31 wherein the monoclonal  
35 antibodies are humanized monoclonal antibodies or fragments or variants thereof.

33. The method according to claim 31 wherein the plurality of monoclonal antibodies, or effective fragments thereof, comprise two or more antibodies that recognize a B cell or plasma cell surface marker selected from the group of CD16, CD19, CD20, CD27, CD30, CD32, CD38, CD40, CD45, CD80, CD86, CD95, CD138, HLA-A, HLA-B, HLA-C, HLA-DR, HLA-DQ, HLA-DP, MHC Class I, MHC Class II, sIgG, sIgM, sIgD, sIgE, and sIgA, hyaluronic acid receptor, alpha interferon receptor, Ig Kappa-or lambda-light chain, Ig heavy chain, and TNF proteins.

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34. The method according to claim 28 wherein administering is carried out orally, parenterally, subcutaneously, transdermally, intravenously, intramuscularly, intraperitoneally, by intranasal instillation, by implantation, by intracavitary or intravesical instillation, intraocularly, intraarterially, intralesionally, by application to mucous membranes.

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35. The method according to claim 28 further comprising:  
periodically repeating said administering.

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36. The method according to claim 28 wherein the B cell or plasma cell-related autoimmune disorder is selected from the group of: systemic lupus erythematosus, Rheumatoid arthritis, diabetes, Sjogren's syndrome, Hashimoto's disease, Wegner's granulomatosis, polyarteritis nodosum, anti-cardiolipin antibody syndrome, autoimmune hepatitis, and B cells cancers of the immune system.

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37. A method of treating a patient for a B cell malignancy comprising:

providing either (i) a polyclonal anti-thymocyte serum or (ii) at least one of a plurality of monoclonal antibodies, or effective fragments or variants thereof, that bind to a malignant B cell surface marker; and

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administering to a patient experiencing a B cell malignancy an amount of (i) or (ii) that is effective to destroy malignant B cells, thereby treating the patient for the B cell malignancy.

38. The method according to claim 37 wherein said method is carried out using a polyclonal anti-thymocyte serum.

39. The method according to claim 38 wherein the polyclonal anti-  
5 thymocyte serum is from a primate or pig.

40. The method according to claim 37 wherein said method is carried out using at least one of a plurality of monoclonal antibodies or effective fragments or variants thereof.

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41. The method according to claim 37 wherein the monoclonal antibodies are humanized monoclonal antibodies or fragments thereof.

42. The method according to claim 37 wherein the plurality of  
15 monoclonal antibodies, or effective fragments or variants thereof, comprise two or more antibodies that recognize a myeloma cell surface marker selected from the group of CD16, CD19, CD20, CD27, CD30, CD32, CD38, CD40, CD45, CD80, CD86, CD95, CD138, HLA-A, HLA-B, HLA-C, HLA-DR, HLA-DQ, HLA-DP, MHC Class I, MHC Class II, sIgG, sIgM, sIgD, sIgE, and sIgA, hyaluronic acid receptor, alpha  
20 interferon receptor, Ig Kappa-or lambda-light chain, Ig heavy chain, and TNF proteins.

43. The method according to claim 37 wherein said administering is carried out orally, parenterally, subcutaneously, transdermally, intravenously,  
25 intramuscularly, intraperitoneally, by intranasal instillation, by implantation, by intracavitary or intravesical instillation, intraocularly, intraarterially, intralesionally, by application to mucous membranes.

44. The method according to claim 37 further comprising:  
30 periodically repeating said administering.

45. A method of treating B cell or plasma cell-related alloantibody disorders in solid organ or bone marrow transplantation, said method comprising:  
providing either (i) a polyclonal anti-thymocyte serum or (ii) at least  
35 one of a plurality of monoclonal antibodies, or effective fragments or variants thereof,

that bind to a B cell or plasma cell surface marker on B cells or plasma cells that are implicated in an alloantibody disorder; and

administering to a patient experiencing a B cell or plasma cell-related autoimmune disorder an amount of (i) or (ii) that is effective to destroy B cells or plasma cells responsible for the autoimmune disorder, thereby treating the B cell or plasma cell-related alloantibody disorder.

46. The method according to claim 45 wherein said method is carried out using a polyclonal anti-thymocyte serum.

47. The method according to claim 46 wherein the polyclonal anti-thymocyte serum is from a primate or pig.

48. The method according to claim 45 wherein said method is carried out using at least one of a plurality of monoclonal antibodies or effective fragments or variants thereof.

49. The method according to claim 46 wherein the monoclonal antibodies are humanized monoclonal antibodies or fragments thereof.

50. The method according to claim 45 wherein the plurality of monoclonal antibodies, or effective fragments or variants thereof, comprise two or more antibodies that recognize a myeloma cell surface marker selected from the group of CD16, CD19, CD20, CD27, CD30, CD32, CD38, CD40, CD45, CD80, CD86, CD95, CD138, HLA-A, HLA-B, HLA-C, HLA-DR, HLA-DQ, HLA-DP, MHC Class I, MHC Class II, sIgG, sIgM, sIgD, sIgE, and sIgA, hyaluronic acid receptor, alpha interferon receptor, Ig Kappa-or lambda-light chain, Ig heavy chain, and TNF proteins.

51. The method according to claim 45 wherein said administering is carried out orally, parenterally, subcutaneously, transdermally, intravenously, intramuscularly, intraperitoneally, by intranasal instillation, by implantation, by intracavitary or intravesical instillation, intraocularly, intraarterially, intralesionally, by application to mucous membranes.

52. The method according to claim 45 further comprising:  
periodically repeating said administering.

53. A composition comprising two or more monoclonal antibodies  
5 or fragments or variants thereof that are effective in binding to a B cell or plasma cell  
surface marker, and either individually or collectively inducing apoptosis to the bound  
cell.

54. The composition according to claim 53 wherein the B cell or  
10 plasma cell surface marker is selected from the group of CD16, CD19, CD20, CD27,  
CD30, CD32, CD38, CD40, CD45, CD80, CD86, CD95, CD138, HLA-A, HLA-B,  
HLA-C, HLA-DR, HLA-DQ, HLA-DP, MHC Class I, MHC Class II, sIgG, sIgM,  
sIgD, sIgE, and sIgA, hyaluronic acid receptor, alpha interferon receptor, Ig Kappa-or  
lambda-light chain, Ig heavy chain, and TNF proteins.

15 55. The composition according to claim 53 wherein the monoclonal  
antibodies or fragments or variants thereof are humanized monoclonal antibodies or  
fragments thereof.

20 56. The composition according to claim 53 comprising three or  
more monoclonal antibodies or fragments or variants thereof.